force touch switches are comfortably positioned at the fingertips and are slightly recessed to prevent accidental activation. Simple electronics known to the art, including an electromagnetic solenoid or a piezo crystal, etc., within the housing simulate the tactile "clicking" that a user would hear and feel if clicking a regular mouse button. In this way, the user knows instinctively when a touch switch is "pressed" and a signal is generated thereby easily developing the habit of avoiding unintentional clicks.

[0144] Alternatively, the touch switches can be optically triggered. The preferred embodiment of this alternative uses infrared optics although other wavelengths can be used. Infrared optics are considered very stable under varied conditions. As shown in **FIG. 10**, the optical touch switch **400** consists of an infrared light sensor **404** and corresponding light source **408** mounted across from one another in a channel **412** at the deepest part of a shallow depression **416**. When incorporated in the pointing device **200**, the shallow depression **416** would exist in the finger tip area of a molded channel such as molded channels **216** and **220** in the surface of the pointing device housing. As shown in **FIG. 10***b*, a light beam **420** passes through the channel **412** from the light source **408** to the light sensor **404** to indicate the absence of a fingertip.

[0145] As illustrated in **FIG. 10***c*, when a fingertip, such as from index finger **108**, extends to virtually the bottom of the depression, the light beam **420** is blocked and the fingertip is detected by the absence of a light beam at the light sensor **404**. A conventional comparator circuit (not shown) may be added to fine-tune the response of the switch. Proper adjustment of both the comparator and the depth of the depression cause the switch to respond exactly when the bottom of the depression is touched by the fingertip. In a preferred embodiment, the actual depression is about twelve millimeters wide and approximately two millimeters deep.

[0146] The use of zero force touch switches for providing the clicking and dragging commands popularized by the mouse pointing device has the potential to reduce the fatigue and injury associated with extended mouse use. Another innovative feature of the present invention is to use the zero force touch switches for vertical scrolling.

SCROLLING CAPABILITY

[0147] In today's world of heavy Internet surfing and the use of other scrollbar-intensive applications, mice with scroll wheels have become popular. See, for example U.S. Pat. No. 6,031,518 for Ergonomic Input Device described above that uses a scroll wheel driven by the middle finger. The direct translation of finger movement into scrollbar motion on the screen can save substantial amounts of clicking and dragging work. In addition to convenience, scroll wheel technology can potentially reduce hand movement and associated stresses. Unfortunately, the flexural action of jockeying the wheel with an index finger is similar to the motions described above in connection with moving a trackball. If done with frequency, such a motion of the index finger becomes yet another cause of harmful tendon and joint stress.

[0148] As is well known with the various mechanical wheels and rollers of traditional mouse devices, these mechanical implements are sensitive to buildups of dust and dirt within the device.

[0149] Superior to a scroll wheel, would be a pair touch switches linked to digital circuitry that generates a pulse matching that of a mouse wheel. With "touch scrolling", the user can simply touch an "up" or "down" touch switch and hold it as long as scroll movement is desired. Some mouse and touchpad controller chips may already include this circuitry, thus simplifying the addition of scroll touch switches. One example is the Synaptics® MultiSwitch TouchPad Model TM41P-350 pin-out of Connector **J1**. This touchpad's built in controller chip includes external connections for adding scroll buttons (or touch switches) with a minimum of extra circuitry.

[0150] A single "scroll-select" touch switch **232** was added to the top of the pointing device housing beside the thumb platform **208**. As seen in **FIG. 13**, in a right handed unit, the scroll select touch switch **232** is situated in the concave protrusion **236** in the comer formed by the left top edge of the main body and the left edge of the bezel. The concave protrusion **236** and scroll select touch switch **232** are advantageously arranged to fit the left edge of the thumb **104** when it is resting on the left edge of the main body's top surface. In a preferred embodiment the scroll select touch switch **232** is a zero-force touch switch that is actuated by minute movements of the thumb to the left. On a left-handed pointing device (not shown), the thumb would move to the right.

[0151] Activation of the scroll select touch switch **232** activates a simple logic circuit, as known to the art, which redirects the function of the zero force touch switches (**224** and **228**) that normally serve as the right and left "mouse buttons" to instead activate each control scroll input of the mouse or touchpad controller chip. While the scroll select touch switch **232** is activated, activation of one of the two zero force touch switches (**224** and **228**) provides an upward edge motion signal to scroll up or a downward edge motion signal to scroll down. Thus, the user's fingers remain in the same position whether "clicking and dragging" or scrolling, and no motion is wasted. In the preferred embodiment of this alternative, the scroll select touch switch **232** is a zero force touch switch of the type described above. Note that a pointing device provided with both upward and downward edge motion areas (**276** and **268**) and a scroll select touch switch **232** may advantageously implement the two edge motion functions with different scrolling speeds so that the upward and downward edge motion areas (**276** and **268**) operate at a first scroll speed for short scrolling operations and the scrolling using a combination of the scroll select touch switch **232** and zero force touch switches (**224** and **228**) would operate at a second higher speed to allow for rapid movement.

[0152] Optionally the pointing device can be configured so that "double-clicking" the "scroll-select switch" puts pointing device in the popular "auto-scroll" mode wherein scrolling of the underlying image within the active window of the displayed image occurs with the x-y input applied via area **260**, (or trackball **280**) and any input to edge motion areas (**264**, **268**, **272**, or **276**). Auto-scrolling differs from normal operation of the pointing device in that an x-y input from any of the above listed inputs would normally first move the position icon **316** to the edge of the active window before scrolling (or panning) the underlying image. In auto-scroll